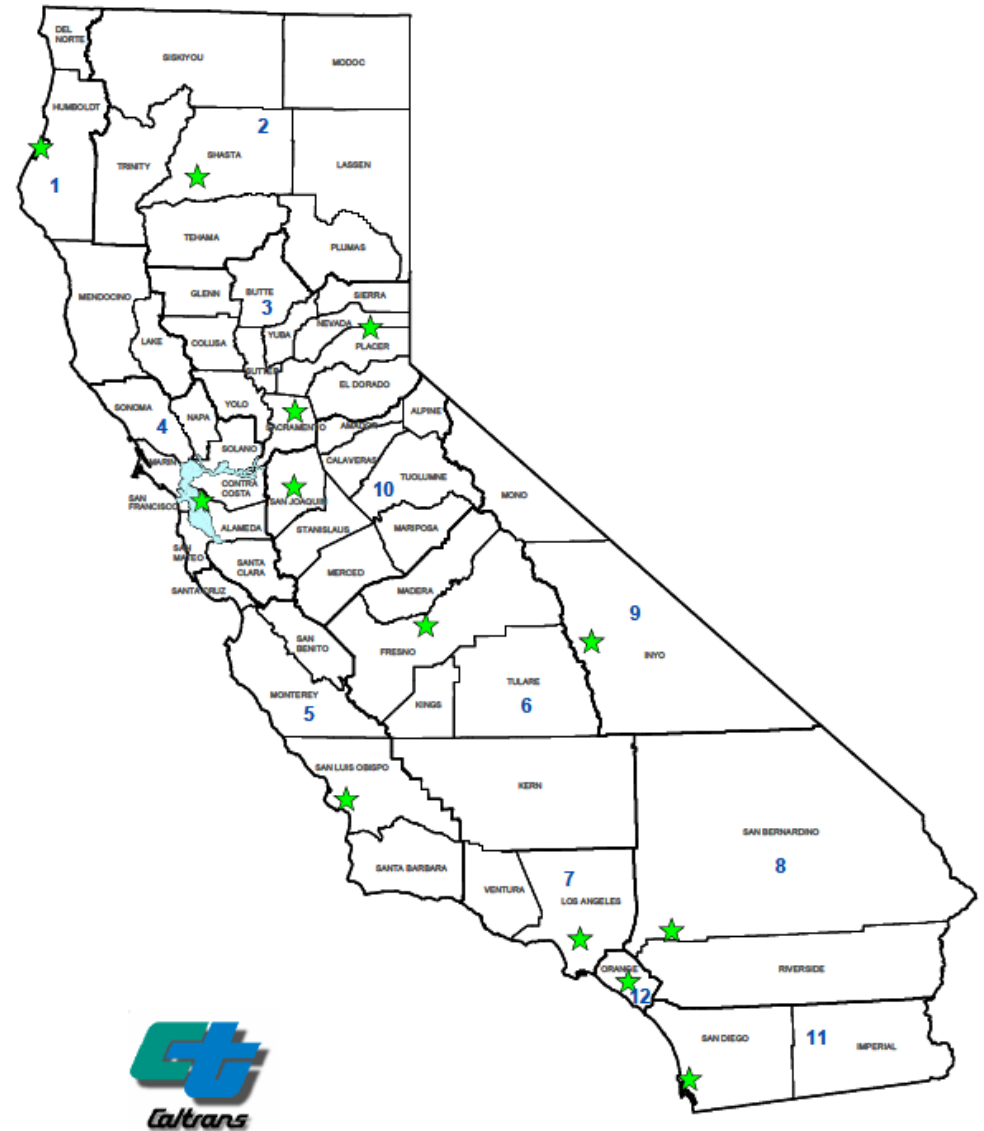# Intelligent Roadway Information System (IRIS)

Stan Slavin, Joe Baltazar, and Keith Koeppen
Caltrans

IRIS ATMS Districts:
1, 2, 5, 10
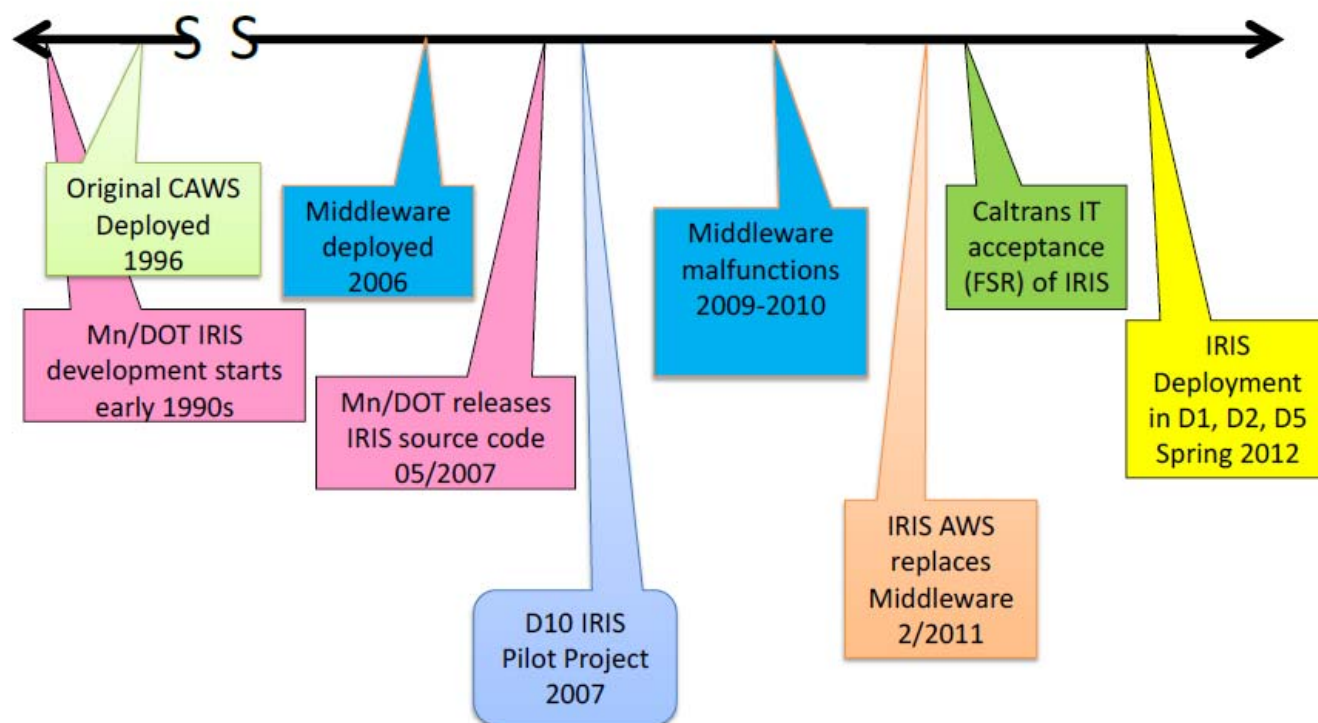
Custom COTS ATMS:
3, 4, 7, 8, 11, 12

No ATMS:
6*, 9
*Fog warning system limited section
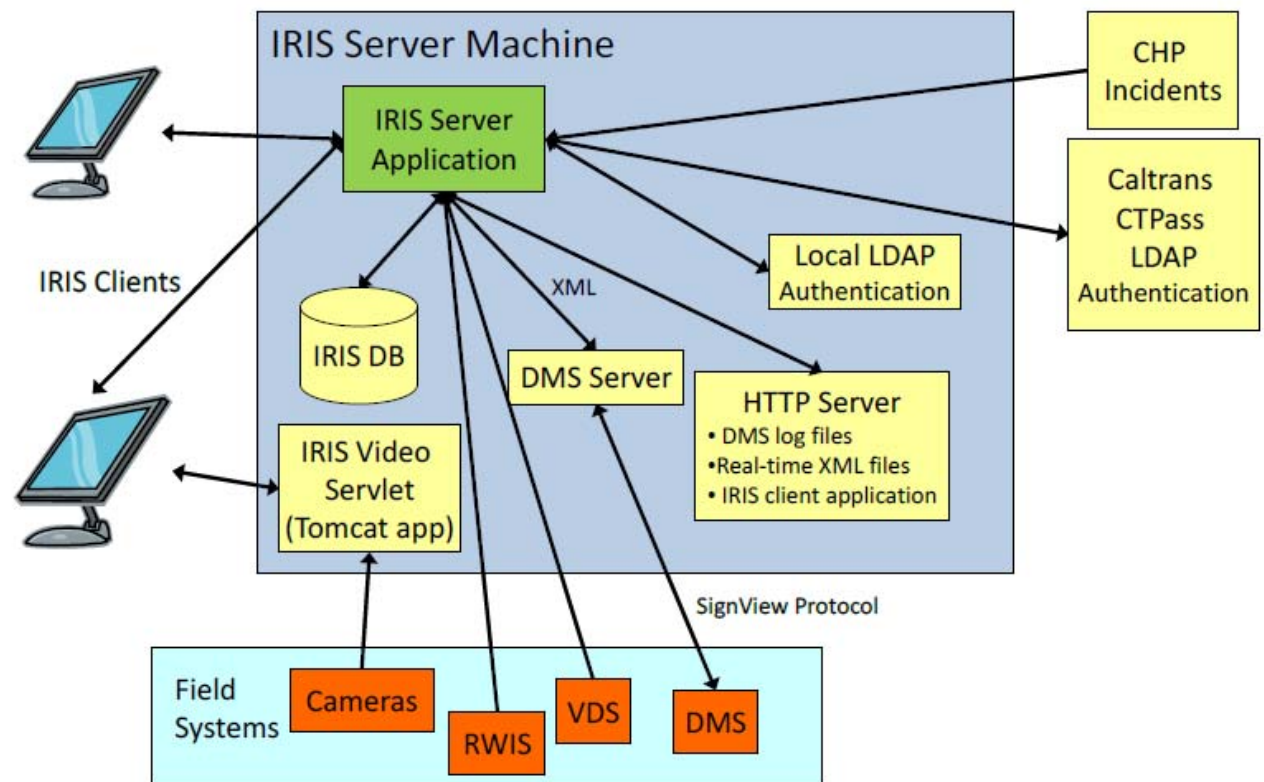
Decision to Pilot

*Timeline for Deploying to 3 additional districts:
- Original Estimate: 6 months
- Actual time: 21 months

Decision to Deploy

- Business Case
- 2-Tier ATMS
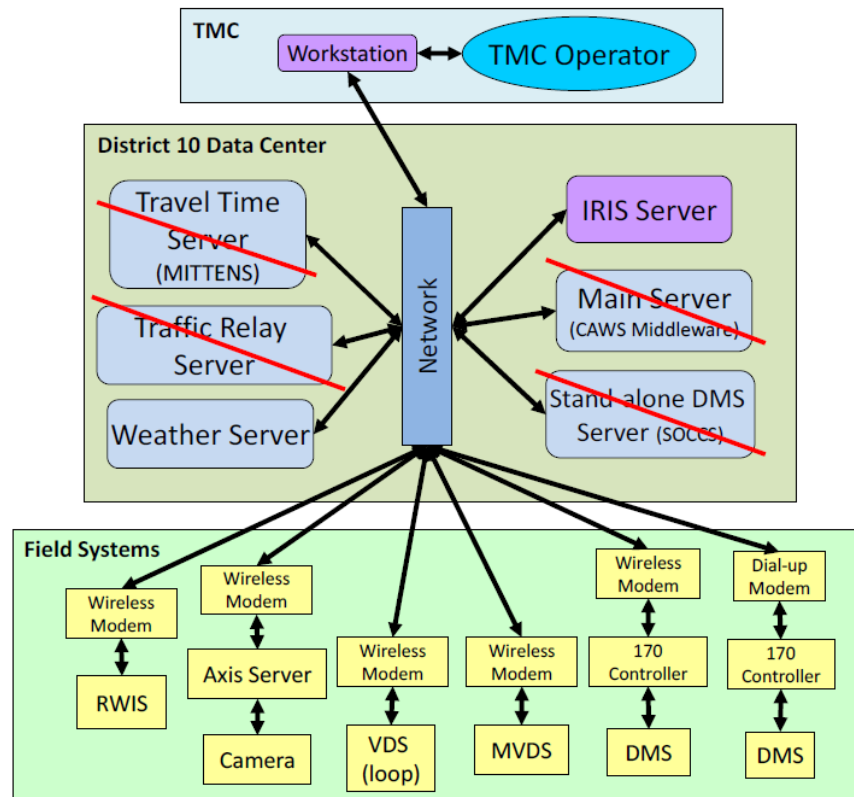- Affordable ATMS solution for rural districts

Benefits

- Affordable ATMS solution
- No Commercial-Off-The-Shelf (COTS) Software/Licensing
- Affordable platform
- Mentorship with MN/DOT
  - Mutual Benefits of Collaboration
  - The Main Trunk
  - We are in this together!

Stand-alone Systems Replaced by IRIS

Scalable, Useful Features, Supportable

	Before	After
Mapping	None	✓
Number of server machines	4	1
Number of CMS controlled by Automated Warning System (AWS)	9	28 (unlimited*)
Types of VDS supported (MVDS, Loops, etc.)	1	5+ (unlimited*)
Types of RWIS supported (Manufacturers)	1	2+ (unlimited*)
Types of CMS controllers supported (Manufacturers)	1	4+ (unlimited*)
Mapped incidents	Via stand-alone app	Integrated
Standby backup system	None	✓
Source code availability	None or proprietary	✓
		* via device driver interface

Deployment Team

- Caltrans Traffic Operations (HQ, Districts 1, 2, 5, and 10, Research), HQ IT PMO

- Minnesota Department of Transportation – Lead developer

- UC Davis Advanced Highway Maintenance & Construction Technology (AHMCT) – Prime Developer
  - Knowledge Systems Design (KSD) – Subcontractor/Developer
  - Iteris – Subcontractor/Developer

- Advanced Systems Engineering – Requirements Management

- Southwest Research Institute (SwRI) – New Prime Developer

Costs: IRIS vs. COTS-based ATMS

Department: Transportation
Project: IRIS

	TOTAL	
	PYs	Amts
One-Time IT Project Costs		
Staff (Salaries & Benefits)	1.4	132,749
Hardware Purchase		34,884
Software Purchase/License		0
Telecommunications		0
Contract Services		
Software Customization		292,558
Project Management		0
Project Oversight		0
IV&V Services		0
Other Contract Services		0
TOTAL Contract Services		292,558
Data Center Services		0
Agency Facilities		0
Other		0
Total One-time IT Costs	**1.4**	**460,191**

Project: D4 ATMS

	TOTAL	
	PYs	Amts
One-Time IT Project Costs		
Staff (Salaries & Benefits)	1.1	112,184
Hardware Purchase		217,054
Software Purchase/License		396,666
Telecommunications		0
Contract Services		
Software Customization		758,283
Project Management		244,546
Project Oversight		0
IV&V Services		0
Other Contract Services		0
TOTAL Contract Services		1,002,830
Data Center Services		0
Agency Facilities		0
Other		0
Total One-time IT Costs	**1.1**	**1,728,734**

IRIS Deployment Considerations

- Systems Engineering
  - Operator/End-User
  - Requirements for customization
  - Global parameters: DMS vs. CMS

- Development Resources
  - in-source/out-source
  - Dedicated team

- Project Management
  - Support Group
  - Stakeholder involvement
  - Release Management (Trac)

Status: Requirements (8 matches)

| Ticket	Summary
#525	CCTV Home Presets for "Daylight" and "Nighttime" Schedules
#528	Display Outside DOT & Cross-District TMS Field Elements
#484	CCTV in Client Streaming Timeout
#503	Camera Map Icons to Use Camera Status Legend "Color"
#506	Jump to Camera Name
#526	Snap to CCTV and CMS Elements
#548	Add Dynamic Features to Map
#251	Client window Size and location persistence

Deployment Considerations

- Documentation
  - Knowledge transfer

- Integration
  - ITS Protocols

- Security
  - Changeable Message Signs
    - Sensor Server
  - UDP / untrusted

Configuration Management

- Internal & Inter-Agency
- Release Management
  - Smaller
  - More frequent
- Features of mutual Interest
- Maintaining a single software "trunk"
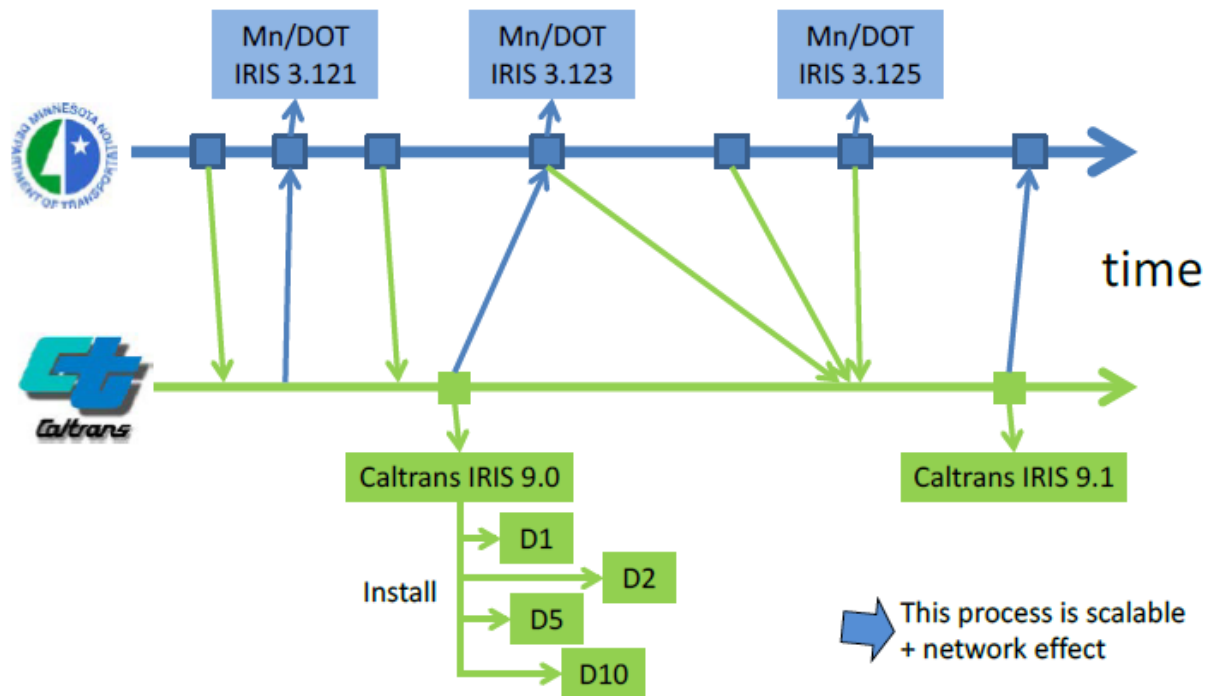
Documentation

- MnDOT (http://iris.dot.state.mn.us/)
  - System Administration
  - Operations
  - As-Built Software Design
  - Adaptive Ramp Metering (in progress)
- Caltrans
  - Maintenance Manual
  - UC Davis AHMCT http://ahmct.ucdavis.edu/?projects=traffic-management-system
  - In Progress
    - Overhaul to Maintenance Manual
    - Architecture Document
    - As Built Software and Interface Design
- Moving Forward
  - Collaborative upkeep of software modules

What has Caltrans added to IRIS?
District 10 - Stockton

- Automated Warning
  - Roadway Weather Information System (RWIS)
  - Warning Thresholds
    - Visibility – fog, dust
    - Slow Traffic Speed
    - High Wind

- **Pe**rformance **M**easurement **S**ystem (PeMS)
  - Direct Traffic Data Feed

- Changeable Message Sign
  - Power recycle alert
  - Preview Status Screens: Small, Medium, Large

NB 99 @ Faith Home Rd
Visibility = 6562 ft
Avg. wind = 4 mph NW
Air temp = 95 °F
Precip rate = 0
Time = 13:32:06 09-12-2014

What else has Caltrans added?
District 2 – Redding

- CCTV
  - Camera User Interface
    - Video Connection/Disconnection
    - Connecting/Disconnecting Decoders
    - Selected Camera Area
    - Still Image Display
  - Camera Presets
  - Return To Home Preset (All Cams Webpage)
- CMS
  - CMS Activation/ Deactivation
  - CMS Control Interface
  - CMS Operation Status
  - Reporting Tools
  - IRIS Dashboard
- Graphical Map
  - Tool Tips

Contacts

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